

From STEM to STEAM: The potential for arts to facilitate innovation, literacy and participatory democracy.

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The value of the arts goes far beyond its monetary returns. Malaika Cunningham outlines how the arts play a huge role in boosting proficiency within STEM subjects. Creative thinking is needed for truly excellent scientists, engineers and mathematicians, and how better to foster this than a rounded education, which includes arts subjects? Arts education fosters a literate and innovative workforce and strengthens the conditions for a healthy democracy.



The arts are an integral part of our humanity and much of the value they offer us is challenging to articulate, it's often emotional or experiential and our language is ill-equipped to deal with its complexity. It being difficult, we often ignore much of the intrinsic value of the arts. When something is inexpressible, it can easily be forgotten or ignored. However, this is not all there is to say of the value of the arts. There are instrumental aspects of the arts which are more easily measured and described: this is especially apparent in the benefits of the arts in education. The sheer scale of evidence portraying the benefits of arts education is significantly staggering.

These are not 'fluffy' or biased reports: many use the same rigorous, unforgiving scientific data as their 'STEM' (Science, Technology, Engineering and Maths) counterparts ([CASE 2010](#), Catterall et al. 2012) and some use datasets collected through more qualitative methods, which arguably present the subtleties of the value of the arts more holistically (Matarasso 1997, DICE 2010). There is evidence, laid out in the language of government, sometimes even laid out BY government, eg. CASE commissioned by the Department for Culture, Media and Sport.



Crossing Paths. Image credit: Bala Sivakumar (CC BY)

Some explore the economic importance of art in schools. This is especially apparent in [the Cost/Benefit report \(2010\) on Creative Partnerships](#). Creative Partnerships (CP) was an initiative put forward by the New Labour government, from the [recommendations of Sir Ken Robinson](#), to put creativity at the heart of the school environment. The report estimates that for every £1 that was put into this project, £15.30 was gained. This was made up of savings on costs of truancy and bad behaviour, savings on recruitment (for teachers who stayed because of the initiative) and likely economic benefits for students receiving 5 A*-C GCSEs (students from CP schools performed better in their GCSEs: including in maths and science). I am personally sceptical of reports which attempt to make the complex values of creativity fit into an economic model such as this. But for those policy makers who respond to numbers, this is pretty black and white, and is certainly not the only of its kind.

The STEM agenda also has an incredibly limited notion of what our economy actually looks like: our creative industries are growing and in 2011 already had an 'aggregate turnover of £12.4 billion' (ACE, 2014). That is a pretty sizeable asset, and can be built upon, but not if we fail to value the arts and culture from an early age.

But I do not want to focus only on the economy and the economic arguments as they are only the very tip of the iceberg of what the arts may offer our education system, and this argument has been made. The value of the arts goes far beyond its monetary returns.

Ironically, the arts also play a huge role to our proficiency within the subjects mentioned in STEM. Maria Miller in her

[recent speech](#) calling for STEAM (the 'A' standing for Arts) over STEM used a Steve Jobs quote to hammer home this point: "It is in Apple's DNA that technology alone is not enough. It's technology married with liberal arts, married with humanities, that yields us the results that make our heart sing." Creative thinking is needed for truly excellent scientists, engineers and mathematicians, and how better to foster this than a rounded education, which includes arts subjects? Neuroscience has shown the importance of art not only for itself, but for encouraging and fostering the imagination needed for excellence in other fields: "One of Einstein's great insights, which was the basis of relativity, occurred when he imagined he was riding a light wave." ([Professor Kagan, Harvard](#)) We learn more than how to paint or play piano in music and art: we learn to use our brains.

A simple place to begin is to ask what we actually want from our education system. Of course we want a huge range of things but a few themes keep coming up: a system which prepares the next generation for the working world, a system which teaches our children social and political values needed for civic and community life, and if we're feeling ambitious, one that actually improves the general welfare of our children.

In terms of the first theme, we need students graduating with skills relevant to employers. Indeed, it's how the whole STEM debate began. In the USA, and in the UK, there is an apparent dearth in competent maths and science teachers, and in those adequately equipped with the skills necessary for the recent and dramatic rise in computing jobs. However, reports have also shown that, along with maths, our literacy rates are [shockingly poor](#). Where is the literacy in STEM? Employers may want technologically savvy staff, but they also want staff who are able to write articulately. They want staff who can work in teams, think critically and [who use their imagination to create new products and services](#). These are all skills proven to be fostered by arts education, and [not through biased research](#): by scientists, sociologists, psychologists and employers themselves.

Indirectly, I am still focussing on the economic benefits. Still I am looking at our students as the 'workforce' which earns our country its GDP and makes us competitive on the world's economic stage. I hope it will not appear too artsy or soft to now move on to a discussion of the importance of the arts in creating a healthy democracy, with happy citizens. The United Nations Development Program has recently introduced the 'Human Development Paradigm' model, which emphasizes the importance of the access of all citizens to health, political participation and education. [The arts and humanities play a key role in this](#). With declining civic engagement and increasing distrust of the political system ([especially amongst young people](#)), now is certainly not the time to be downplaying the importance of the arts.

At the Crick Centre, we are currently researching the potential for participatory arts to facilitate political participation, with particular emphasis on young people. The theory follows the work of a number of thinkers from a variety of disciplines and explores a number of datasets and studies which claim a connection between the arts and [empathy](#), arts and building confidence, arts and social capital, cultural capital and civic engagement. But one theme for me feels particularly relevant in terms of the STEM and STEAM debate: the important role the arts play in building upon our capacity for imagination. We need citizens who are demanding, who are creative and innovative. We need citizens who are engaged and challenging. But most of all, we need citizens who can imagine a different world. Otherwise, the STEM tools needed to get there become quite meaningless.

Also see a related TED talk where [Sir Ken Robinson outlines 3 principles crucial for the human mind to flourish](#) — and how current education culture works against them.

Note: This article gives the views of the author, and not the position of the Impact of Social Science blog, nor of the London School of Economics. Please review our [Comments Policy](#) if you have any concerns on posting a comment below.

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